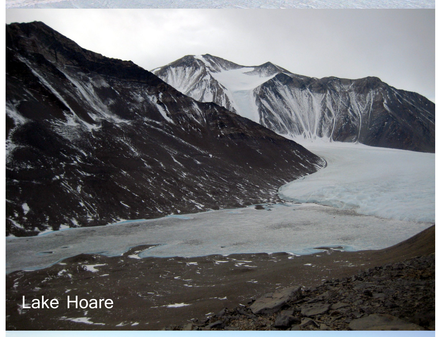
- Ice-covered, closed basin lakes are the terrestrial endpoints of hydrologic flow in the McMurdo Dry Valleys.
- Lakes are excellent indicators of greater catchment processes.
- Most studies have been based on sampling during the Antarctic summer.
- However, as the sole repositories of liquid water during the winter, it is likely that we have underestimated the ecological complexity of the lakes.
- It is hypothesized that climate warming in Antarctica will amplify water and nutrient cycling between glaciers, rivers, and lakes, and increase biodiversity and productivity throughout the ecosystem.
- Analyses of our long term datasets will enable us to investigate the larger processes that are controlling changes in the physical hydrology of the lakes.



TEMPORAL

GOAL 1) To establish a long term dataset to understand climatic and hydrologic variability

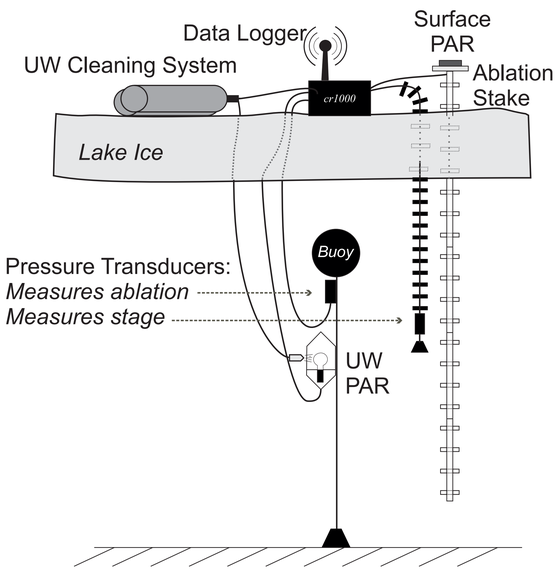


Fig 1. Setup of lake monitoring equipment

LAKE STATIONS

Measurements include lake level, ablation, underwater radiation, and ice thickness.

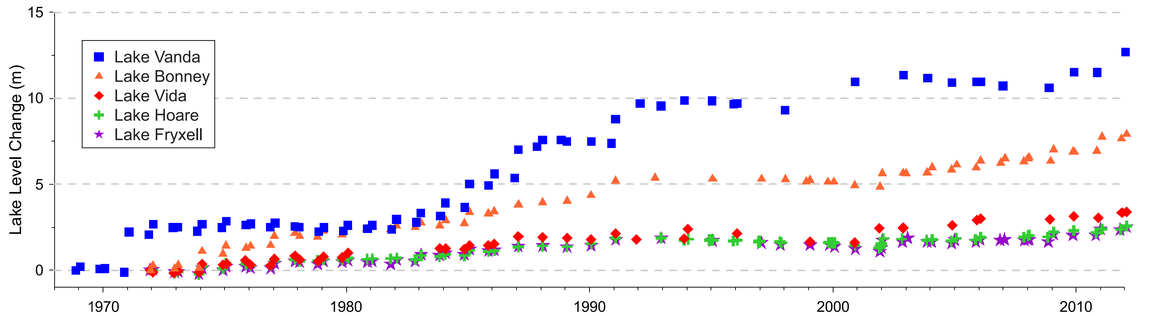


Fig 2. Lake level changes of the McMurdo Dry Valley lakes

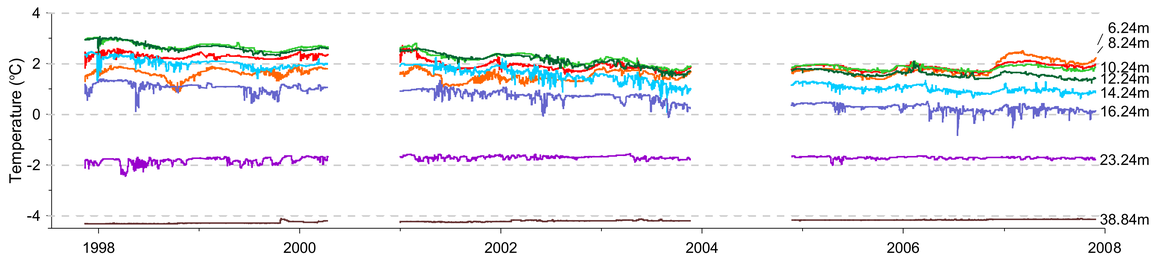


Fig 3. West Lake Bonney water column temperatures

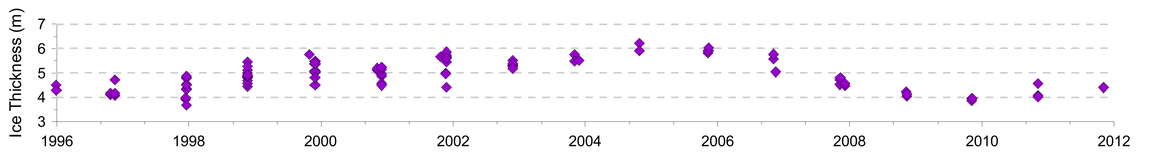


Fig 4. Lake Fryxell ice thickness

High-resolution monitoring of long term changes in physical limnology

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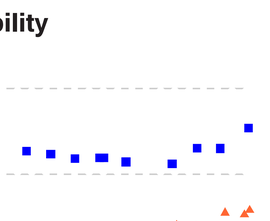
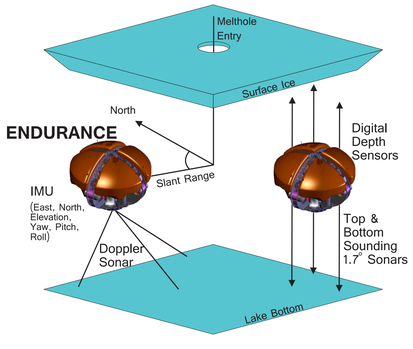
McMurdo Dry Valleys, Antarctica



SPATIAL

GOAL 2) To investigate the physical characteristics of the lakes in high-resolution spatial detail



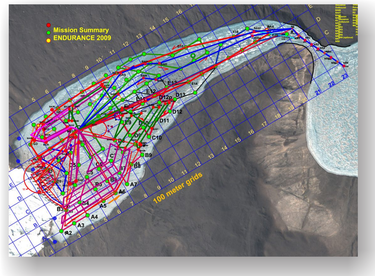


Fig 5. Deployment and spatial coverage of ENDURANCE beneath the ice cover in West Lake Bonney

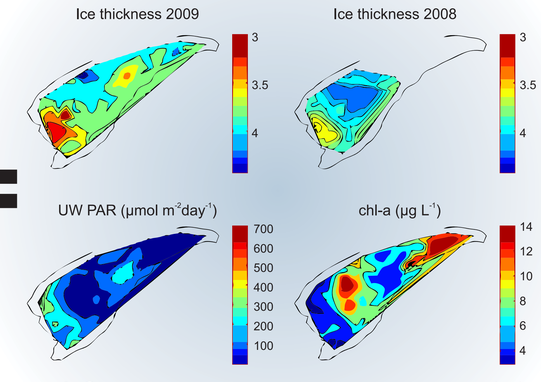


Fig 6. Spatial heterogeneity in ice thickness, underwater PAR and chlorophyll A in West Lake Bonney

(2008: 86 sonde drops, 2009: 189 sonde drops)

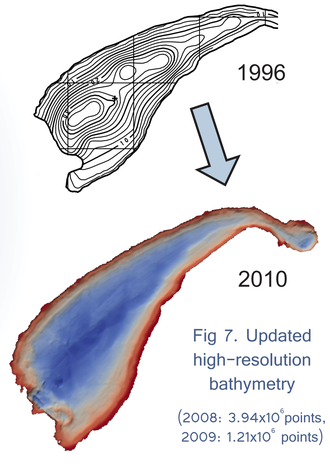


Fig 7. Updated high-resolution bathymetry

(2008: 3.94x10^6 points, 2009: 1.21x10^6 points)

ENDURANCE An autonomous underwater vehicle capable of generating 3D biogeochemical datasets, high-resolution bathymetric and ice thickness maps, and imaging of the underwater face of Taylor Glacier.

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